Report – a source relied on by the CLEC industry[28] – total CLEC revenues (excluding long distance revenues) increased five-fold between year-end 1998 ($8.5B) and year-end 2001 ($44B). *See* Figure 7.[29] New Paradigm estimates that CLEC revenues from switched local services increased from $3.5 billion in 1998 to $9.5 billion in 2001.[30] The latest revenue data compiled by the FCC show CLECs with a total of $8.5 billion in local revenues as of year-end 2000.[31] Since the time of the last UNE review, the number of CLECs earning $100 million or more has nearly doubled. *See* Figure 8.

CLECs specifically target customers that generate high levels of traffic and revenues[32] – analysts and the FCC report that the CLECs' share of revenues is between 12 and 20 percent higher than their share of lines.[33] And the CLECs' share of high-end local services is considerably higher than their share of local revenues overall. For example, the CLECs' share of special access revenues is between 28 and 39 percent.[34] The big three interexchange carriers control more than two-thirds of the revenues for ATM and Frame Relay services.[35]

CLECs that provide local services also earn significant revenues from the provision of other telecommunications services. According to New Paradigm, CLECs now earn nearly $25 billion from the provision of data and data-related services such as Internet access, frame relay,

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carriers that are both CLECs and interexchange carriers, including AT&T and WorldCom – the largest carriers in both categories – who report their revenues as both kinds of entities. *See* Appendix L.

[28] *See, e.g.*, ALTS, *The State of Local Competition 2001* (Feb. 2001); ALTS, *An ALTS Analysis: Local Competition Policy & The New Economy* (Feb. 2, 2001); ALTS, *The State of Competition in the U.S. Local Telecommunications Marketplace* (Feb. 2000).

[29] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 1 at Table 3; *NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at Table 9. "Other" revenues reported by New Paradigm (*i.e.*, reciprocal compensation and non-telecom related revenues) are excluded from these totals. Credit Suisse First Boston estimates that total CLEC revenues (excluding long-distance and data revenues) have grown from approximately $5 billion in 1998 to approximately $12.5 billion in 2001. *See CSFB 4Q00 CLEC Vital Signs Review* at Table 11 (4Q1998); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (1Q 2001-3Q 2001 results; 4Q 2001 estimate).

[30] *Compare NPRG CLEC Report 2000, 12th ed.*, Ch. 1 at Table 3 *with NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at Table 8. Credit Suisse First Boston estimates that CLEC revenues from switched local services has increased from approximately $3.7 billion in 1998 to $10.8 billion in 2001. *See CSFB 4Q00 CLEC Vital Signs Review* at Table 11 (4Q1998); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (1Q 2001-3Q 2001 results; 4Q 2001 estimate).

[31] *FCC Telecommunications Industry Revenues, 2002 ed.* at Table 7; *NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at Table 8.

[32] *See, e.g.*, Legg Mason, *Telephone Wars: Local Competition Update* at 2 (May 22, 2001) ("The CLEC sales figures reflect larger market share gains than those calculated on the basis of line lost, since the majority of lines lost are of the high-usage commercial type.").

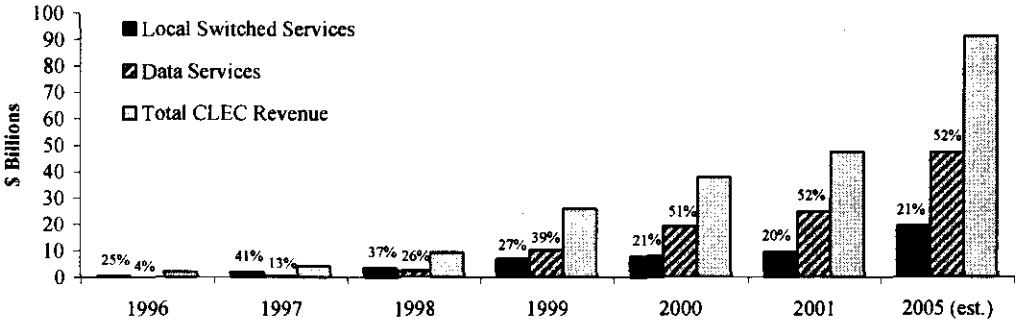
[33] *See, e.g., id.* at 3 (At the end of 1Q01 "the CLEC share of the total US line market was 7.6%," while "the CLEC's share of the gross industry revenues was approximately 9.2%," a difference of 21%.); *FCC Local Competition Report, Feb. 2002 ed.* at 4, Table 1 ("The share of local service revenues claimed by carriers competing with the ILECs" was 8.9% in 2000 while CLECs reported a 7.7% share of end-user switched access lines in December 2000, a difference of 15.6%); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (Through 3Q01, local competitors' share of U.S. access lines was 9.7%, while local competitors' share of the local market revenues at quarter end was 10.9%, a difference of 12.4%).

[34] *See* Section V.C & Appendix L.

[35] *See* Section II.B, Figure 5.

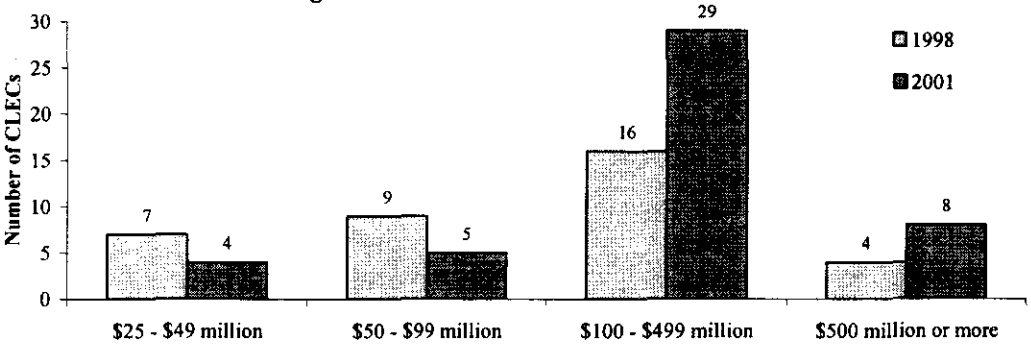
ATM, DSL, "and other enhanced data and Web-related services."[36] CLECs other than the big interexchange carriers earn an additional $3 billion from the provision of long distance services.[37] Cable telephony providers are able to bundle video and data services with the voice services they provide, and analysts expect "video/voice" to be the "most popular" bundle of service desired by consumers.[38]

Figure 7. CLEC Revenues



Source: New Paradigm Resources Group. *See* Appendix M.

Figure 8. CLEC Revenue Distribution



Source: New Paradigm Resources Group. *See* Appendix M.

If cable companies are counted among them, CLECs earn substantial revenues in the local, high-speed data transport sector as well. Cable companies earned an estimated $2.3 billion from the provision of high-speed data services in 2001, and that figure is projected to exceed $10 billion by 2006.[39]

Wireless carriers also are competing directly with ILECs for a large and increasing share of revenues. As of year-end 2000, wireless carriers reported $62 billion in revenues, which

[36] *NPRG CLEC Report 2002, 15th ed.*, Ch. 3 at 3.

[37] *See id.*; *see also FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 10.1 ($1.3 billion in toll revenues earned by CAPs and CLECs as of year-end 2000).

[38] *JP Morgan Cable Industry Report* at 42.

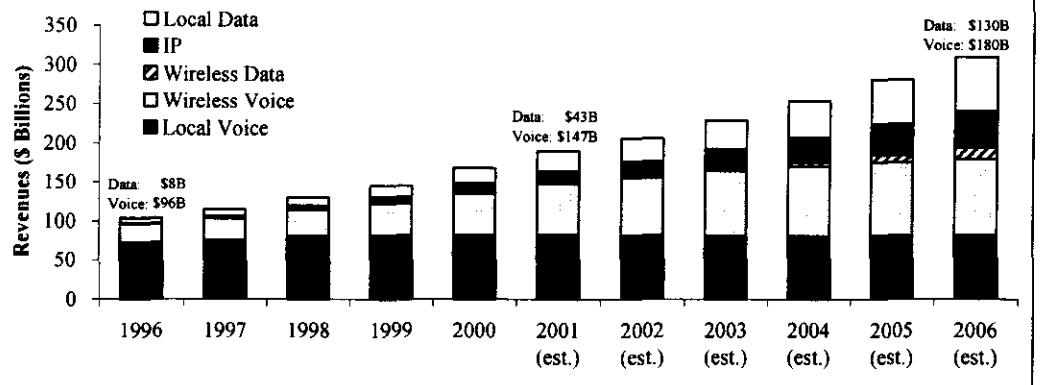
[39] *See* R.A. Bilotti, *et al.*, Morgan Stanley, Dean Witter, *Broadband Cable Television* at 9 (July 3, 2001).

represents more than half of the revenues that wireline carriers reported for local service.[40] At the time of the last UNE review, wireless revenues were at $37 billion, about one-third the amount of wireline local revenues.[41]

E. Outlook.

As a percentage of the overall telecommunications market, wireline local voice is rapidly declining, as local traffic moves on to wireless and data networks, and the volumes of data traffic continue to surge. *See* Figure 9. Wireline local voice revenues grew by an average of 2.7 percent per year between 1996 and 2001, but are expected to remain constant over the next five years.[42] While wireline local voice revenues represented approximately 44 percent of all local revenues in 2001, they are expected to represent only 26 percent by 2006.[43]

Figure 9. Wireless and Data Overtaking Voice



Source: JP Morgan H&Q. *See* Appendix M.

Cable telephony providers are expected to "have more than 10 million circuit-switched telephony customers in 2006."[44] Cable operators will have deployed IP-telephony widely by that time as well, and are expected to serve nearly five million telephony customers over packet-switched networks.[45]

Data traffic has already overtaken voice traffic on the telephone network, and data traffic is growing much faster than voice. Most access-line growth between 1996 and 2000 was due to data, with customers adding second lines as a dedicated Internet/fax line.[46] These lines are now

[40] *See FCC Telecommunications Industry Report, 2002 ed.* at Table 1.

[41] *See CTIA's Semi-Annual Wireless Industry Survey Results.*

[42] *See JP Morgan Telecom Services 2001 Report* at Table 1.

[43] *See JP Morgan Telecom Services 2001 Report* at Table 1.

[44] *Forrester Sizing US Consumer Telecom Report* at 10.

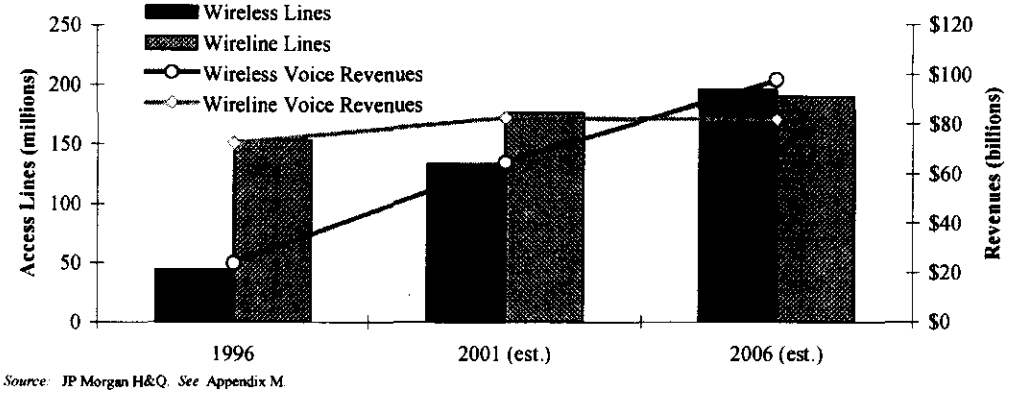
[45] *See Forrester Sizing US Consumer Telecom Report* at 10-12.

[46] *See, e.g., Gartner U.S. Residential Wireline Report* at 5 ("additional line growth rates have been significantly higher among online households than their offline counterparts.").

in rapid decline, with most customers opting for a wireless or cable connection instead of a second line.[47] By 2006, it is expected that 17 million circuit-switched lines will have been superceded (*i.e.*, rendered technologically obsolete) by wireless, cable modem, and non-DSL packet-switched connections.[48] Local data revenues are expected to grow to nearly $70 billion in the next five years.[49] By that time, data is expected to make up 46 percent of all local revenues, up from 24 percent today. *See* Figure 9. A great deal of data traffic is carried on non-ILEC networks. Cable modem is adding residential broadband subscribers much faster than DSL, and cable is expected to maintain a two-to-one lead over DSL five years from now.[50]

Wireless carriers are adding subscribers much faster than their wireline counterparts – in percentage terms, and in absolute terms, too. Some twenty million new subscribers are being added annually.[51] IDC estimates that, by 2005, wireless "lines" will have cumulatively displaced a total of approximately 20 million wirelines (counting both primary and secondary access lines).[52] Wireless minutes of use are growing at over 60 percent per year, while landline minutes are growing at "low single digits."[53] By 2003, wireless voice revenues are expected to surpass wireline voice revenues. *See* Figure 10.

Figure 10. Wireless vs. Wireline Growth



Source: JP Morgan H&Q. *See* Appendix M.

[47] *See, e.g., id.* at 7-9 (finding that, from January to June 2001, 6 million households (6 percent of all households) have replaced a traditional telephone access line with another form of communications line, and 61.5 percent of those 6 million have chosen wireless or cable); *see also* Sections II.C & IV.B.

[48] *See Forrester Sizing US Consumer Telecom Report* at Figures 6 & 8-1.

[49] *JP Morgan Telecom Services 2001 Report* at 25.

[50] *See, e.g., JP Morgan Telecom Services 2001 Report* at Table 16 (Nov. 2, 2001) (showing 25.9 million residential cable modem subscribers and 12.9 million residential DSL subscribers in 2006.); *see also Morgan Stanley Cable Modem/xDSL Report* at Exh. 1; Section IV.C.

[51] *See CTIA's Semi-Annual Wireless Industry Survey Results.*

[52] *See IDC Wireless Displacement Report* at Figure 23; *see also Forrester Sizing US Consumer Telecom Report* ("Over the next five years, the mobile business will take a cut at fixed-line revenues. Wireless operators will ravage the fixed-line business as 5.5 million consumers give up secondary lines, and an additional 2.3 million cut the cord on their primary line.").

[53] *3g Rollouts Inch Along, But Kagan Research Indicates Wireless Minutes Roaring Ahead, Set to Dominate Telecom Landscape by 2005 Leading Executives to Debate Market Demand, Technology and Financing at Kagan's Wireless Telecom Summit May 2-3 in New York*, Bus. Wire (Apr. 27, 2001); *see* Section II.C.

Next-generation broadband technologies are now being deployed.[54] Much of the copper distribution plant will have to be replaced with fiber in order to support the growing demand for broadband services. Wireless broadband services – both fixed and mobile – are coming, too. Analysts predict that 3G mobile networks will be widely deployed by 2004 or 2005. The Commission also has recently taken the first steps to "pave the way for new types of products incorporating ultra-wideband (UWB) technology" – devices that may be able to operate on spectrum already occupied by existing radio services without causing interference. It has also resolved to explore the introduction of "software defined radio" (SDR) technology, which could allow a single device to be quickly reprogrammed to transmit and receive on any frequency within a wide range using virtually any transmission format. There also are a host of other technologies currently under development that will be capable of provisioning wireless broadband services. These include Digital SMR, third generation mobile systems, 2 GHz MSS satellite systems, L-Band satellites, and Big LEO satellites. Recent advancements in fixed wireless technologies – particularly Non-Line-of-Sight technologies – are expected to "cause a spur in service provider deployments."

Entirely new telecommunications networks are being deployed to satisfy surging demand for high-speed packet-switched data services. Much of this new infrastructure has little relation to the old. Fiber is replacing copper in the loop; packet switches are replacing circuit switches in the central office; and the transport between these packet switches is using very different routes than the rigid point-to-point connections between central offices that have prevailed in the past. In deploying this new infrastructure, ILECs will enjoy no particular advantages over competing carriers.

Most of the broadband market that is now emerging remains up for grabs. Most of the technology that will ultimately be used to provide ubiquitous broadband service has not yet been developed. Most of the capital has not yet been committed. Most of the customers are not yet being served. And because broadband digital services will ultimately absorb and displace the old, analog voice and video, no established player in telecom, cable, or broadcast markets today has any assurance of winning any durable share of the vast digital market ahead.

[54] *See* Section V.D.

II. LOCAL SWITCHING

At the time of the FCC's last UNE review, CLECs had deployed approximately 700 local circuit switches.[1] Today, CLECs operate approximately 1,300 *known* local circuit switches. *See* Appendix B.[2] At the time of the last UNE review, CLECs were serving about six million lines using switches they had deployed.[3] As of year-end 2001, CLECs were serving no fewer than *16 million* local lines, and likely closer to *23 million* local lines – including approximately three million *residential* lines – over their own switches. CLEC switches are now so geographically widespread that they are being used to serve local customers in wire centers that contain approximately *86 percent* of the Bell companies' access lines. In the 100 largest Metropolitan Statistical Areas (MSAs), CLECs are using their switches to serve local customers in wire centers that contain approximately *96 percent* of the BOC access lines in those MSAs. *See* Appendix C. All of these figures are conservative, because they are drawn from public sources or from the necessarily limited data available to the BOCs.

More than 200 CLECs of all sizes have actually deployed local circuit switches in the Bell companies' regions. While the two largest CLECs (AT&T and WorldCom) account for more than 25 percent of these switches, the next 15 largest CLECs (measured by switch ownership) account for an additional 37 percent of all local circuit switches. *See* Figure 1. The number of CLECs operating 10 or more circuit switches has increased from 15 to 27 since the time of the last UNE review, while the number operating 20 or more has increased from 6 to 16.[4] And with the exception of AT&T and WorldCom, the 15 largest switch-based CLECs (measured by switched-based lines served) make virtually no use of unbundled switching, either on a stand-alone basis or as part of the so-called UNE-Platform. *See* Figure 2.

Cable companies have deployed large number of circuit switches that they are using, in combination with their own loops, to provide cable telephony service that bypasses ILEC networks completely. This service is now available to more than 10 percent of all U.S. homes and there are more than 1.5 million actual subscribers. Cable telephony is now available statewide in some smaller states (like Cox service in Rhode Island) and to a large and growing fraction of homes in a number of larger states (*e.g.*, AT&T service in and around Pittsburgh, Boston, Chicago, and the Bay Area, and Cox service in San Diego, Orange County, and the Tidewater area of Virginia).

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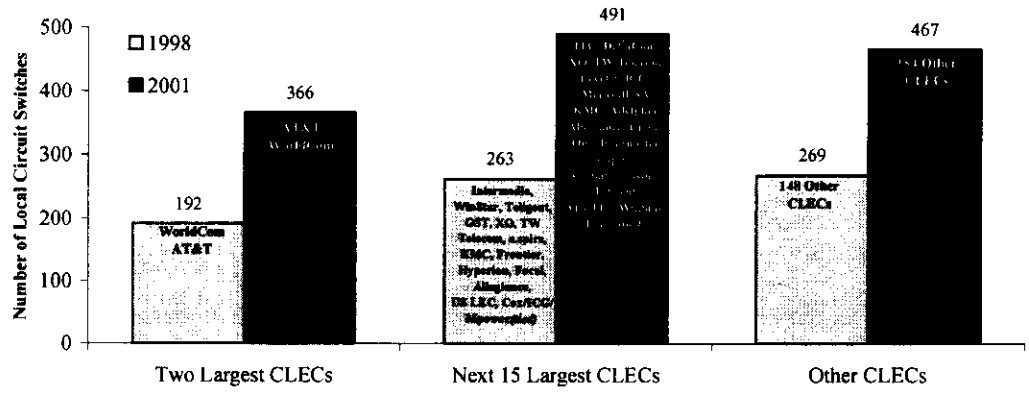
[1] *See UNE Remand Order* ¶ 254 ("As of March 1999, approximately 167 different competitors have deployed approximately 700 switches throughout the country.").

[2] *See* Telcordia, *January 2002 LERG*. New Paradigm Resources Group ("NPRG") reports that, as of year-end 2001, CLECs had deployed 1,244 circuit switches with another 92 circuit switches planned. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at 20. That figure is based on the circuit switches of 70 companies profiled by NPRG. *See id.* By comparison, the LERG database indicates that approximately 200 competing carriers have deployed circuit switches. *See* Appendix B.

[3] This figure is based on the number of interconnection trunks CLECs had obtained as of year-end 1998 (*see* Section I, Table 3), and assumes that for each trunk a CLEC had obtained as of that date, the CLEC was serving 2.75 lines. *See* Appendix A (describing this methodology in more detail).

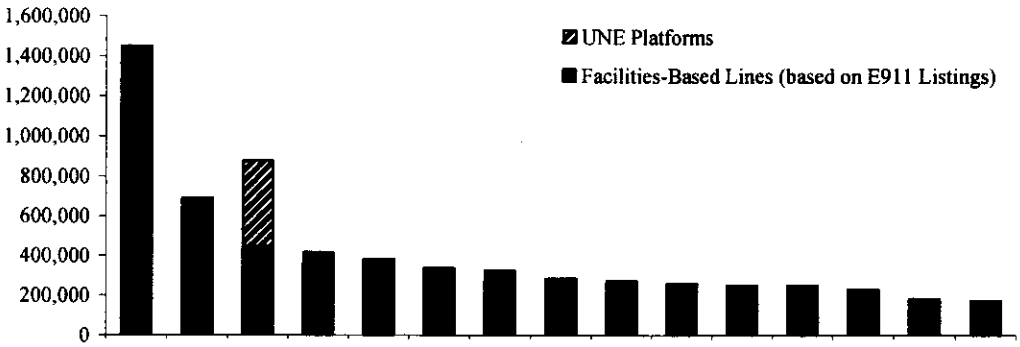
[4] *See* Section V, Figure 1.

Figure 1. Distribution of CLEC Switches



Sources: Telcordia, *Local Exchange Routing Guide (LERG)*. *See* Appendix M.

Figure 2. Use of UNE Platforms by Top 15 Switch-Based CLECs Other Than AT&T and WorldCom



Top 15 CLECs represented include: Allegiance Telecom, Cablevision Lightpath, Choice One, Cox, Electric Lightwave, Focal Communications, ICG, Intermedia, McLeodUSA, Mpower, Net2000, RCN, Sprint, WinStar, and XO.

Packet and wireless switches are now placing significant, additional competitive pressure on ILECs' traditional circuit switches. At the time of the last UNE review, 36 million households still relied on dial-up connections – and thus on ILEC circuit switches – for their data services.[5] As discussed further in Section IV.C, however, nearly eight million users now have broadband cable or wireless data links instead, which bypass the circuit switch completely and terminate directly on a competitive packet switch. If all of these broadband users would otherwise be using dial-up connections, the packet switches used to provide these services now displace at least 4 percent of all circuit-switched minutes of use, even assuming that the average data line is used only as much as the average voice line. The total would be far higher if one takes into account the fact that data calls generally last much longer than voice calls. Since the last UNE review, the installed base of CLECs' *known* packet switches has jumped from 860 to more than 1,700.[6] *See* Appendix E.

[5] *See JP Morgan Cable Industry Report* at Table 13 (36.7 million online households in 1998 minus 700,000 broadband households equals 36 million dial-up households).

[6] *See NPRG CLEC Report 2000, 12th ed.*, Ch. 6 (1998 total); *NPRG CLEC Report 2002, 15th ed.*, Ch. 4 at

The dramatic rise of wireless services since the last UNE review is certainly having a similar impact on circuit-switched ILEC traffic. As of year-end 1998, there were about 69 million wireless subscribers; as of year-end 2001, there were an estimated 130 million, as compared to about 190 million wireline switched access lines.[7] Today, a large and rapidly growing number are using wireless service as a substitute for second and additional lines, and a growing number are abandoning their wireline phones altogether. There were approximately 200 billion billable minutes of wireless use in the first half of 2001, and by the end of 2001 wireless calls accounted for an estimated 12 percent of all U.S. phone calls. Many wireless carriers offer particularly attractive long-distance calling plans; when the wireless phone is used for long-distance calls, the ILEC loses traffic not only in end office switches but in access tandems, too. Wireless carriers not affiliated with the Bell companies have deployed at least 950 local switches. *See* Appendix F.

A large and growing fraction of business customers also locate switching equipment directly on their premises, which enables them to perform a portion of their local switching in-house, rather than outsource it to an ILEC's circuit switch. Today, there are approximately 56 million lines served through private branch exchanges (PBXs). A PBX performs all the local switching between the lines that connect to it directly. Moreover, a new generation of PBXs that use IP-based packet switching instead of circuit switching make PBXs economical for an even larger share of businesses.

Table 18 (2002 total). This is a highly conservative estimate. It does not include the 840 packet switches NPRG lists for competitive Independent Operating Companies, utility CLECs, data providers, or Gig-E providers. In addition, it does not include the 7,000 packet switches that NPRG lists for AT&T as of year-end 2001. According to NPRG's prior reports, AT&T had only 50 packet switches as of year-end 2000. Because one-year growth of this magnitude is unlikely, in an abundance of caution we have used the 2000 figure for AT&T's packet switches.

[7] *CTIA's Semi-Annual Wireless Industry Survey Results*; CTIA, *CTIA's World of Wireless Communications*, http://www.wow-com.com (131 million U.S. wireless subscribers as of Feb. 12, 2002); *CSFB 3Q01 CLEC Vital Signs Review* at Exh. 9 (189 million U.S. access lines as of 4Q2001).

Table 1. Competition for ILEC Circuit-Switched Local Traffic				
	Switches	**Subscribers/Lines**	**Minutes**	**Revenues**
CLEC Circuit Switches	1,300 CLEC circuit switches (plus 360 remote switches)	At least 16 million lines, and likely closer to 23 million lines served on CLEC switches	493 billion minutes originating/terminating on CLEC switches per year	$10 billion (CLECs switched local service revenues)
Wireless	950 non-BOC wireless switches	130 million wireless subscribers	500 billion minutes originating/terminating on wireless switches per year	$64 billion (wireless voice revenues)
Data	1,700 CLEC packet switches	8 million residential cable/wireless/satellite broadband subscribers	Six times more data traffic than voice Traffic over broadband connections exceeds traffic over narrowband	$2 billion cable modem revenue $6 billion CLEC/IXC ATM/Frame Relay revenue
PBX	n/a	56 million PBX lines	Intra-PBX switching on 44 percent of all business lines	n/a
Sources: See Appendix M.				

A. CLEC Circuit Switches.

By very conservative estimates, CLECs are serving no fewer than *16 million* local lines, and likely closer to *23 million* local lines – including approximately three million *residential* lines – over the local circuit switches they have deployed. *See* Table 2 & Appendix A. CLECs serve a far larger number of actual circuits using their switches, because many of the lines they serve are high-capacity lines.[8]

Table 2. Lines Served over CLEC Switches, YE 2001				
	Based on E911 listings			**Based on Interconnection Trunks***
	Business	**Residential**	**Total**	
Verizon**	3.7 million	1.0 million	4.7 million	7.8 million
SBC***	4.5 million	1.2 million	5.7 million	8.6 million
BellSouth	1.8 million	300,000	2.1 million	3.5 million
Qwest	2.9 million	500,000	3.4 million	2.5 million
Total	**13 million**	**3 million**	**16 million**	**23 million**
*Assumes a ratio of 2.75 lines per interconnection trunk. *See* Appendix A (providing basis for this methodology). ** Verizon E911 listings and interconnection trunk data do not include the former GTE service area. *** SBC E911 listings data do not include Connecticut.				

CLECs are using their switches to serve local customers in one of two ways. First, they are porting numbers from ILEC switches to their own switches using local number portability (LNP). Second, they are using NXX codes obtained from the North American Numbering Plan administrator.

[8] *See* Sections I.B, Table 4 & IV.A; *see also* Appendix A.

CLECs have ported approximately 14 million telephone numbers in the Bell companies' regions, virtually all of which have been ported since the time of the last UNE review.[9] In the last year alone, the number of CLEC ported numbers has grown by more than 70 percent. *See* Table 3. This demonstrates that CLECs have not only significantly increased their deployment of circuit switches, but also that they are now using these switches extensively to win local customers.

Table 3. Growth of Ported Numbers

	2000	2001	Growth
Verizon	2.7 million	4.7 million	77%
SBC*	3.0 million	5.1 million	73%
BellSouth	1.1 million	1.8 million	64%
Qwest	1.4 million	2.4 million	71%
Total	**8 million**	**14 million**	**73%**

Growth percentages may not equal the differences shown due to rounding. * SBC data do not include Connecticut.

1. Geographic Areas Served by CLEC Circuit Switches.

As the FCC has recognized, competition for switched services may be assessed by analyzing where CLECs have obtained ported numbers and NXX codes.[10]

The Bell companies maintain internal data of the wire centers in which CLECs have ported telephone numbers from the BOCs' switches to the CLECs' own switches.[11] Each number ported from a BOC's switch to a CLEC's switch represents a telephone served by that competitor's own switch. Each wire center in which a CLEC has obtained a ported number therefore represents a geographic area where a CLEC is actually competing for local customers today using switches that it has deployed itself.

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[9] *See Telephone Number Portability*, Third Memorandum Opinion and Order on Reconsideration, 13 FCC Rcd 16090, ¶ 2, n.7 (1998) (first requiring ILECs to implement LNP in the 100 largest MSAs by December 31, 1998).

[10] *See, e.g., FCC Local Competition Report, Aug. 1999 ed.* at 2, 43, Tables 4.1-4.3 & 5.1 (summarizing NXX code assignment activity and supplying information on ported numbers which "should provide insights into the number of customer lines served by competitors"); *id.* at 43 (using an NXX-based analysis for identifying "new entrants in the switched market."); *id.* ("A local service competitor that owns a telephone switch must acquire a numbering code for that switch before commencing operation as a facilities-based CLEC providing mass market telephone service."); *UNE Remand Order* ¶ 254 (noting with approval SBC's evidence of competition for switching "using a methodology that tracks requesting carriers' switches by examining migration of lines using ported numbers."); *id.* ¶ 285 (relying on data of CLEC switches with NXX codes as basis for creating exception to national unbundled switching rule in Zone 1 wire centers).

[11] A wire center is "the location of a local switching facility containing one or more central offices." 47 C.F.R. § 54.5; *see id.* ("wire center boundaries define the area in which all customers served by a given wire center are located."); *see also Policy and Rules Concerning Rates for Dominant Carriers and Amendment of Part 61 of the Commission's Rules to Require Quality of Service Standards in Local Exchange Carrier Tariffs*, Memorandum Opinion and Order, 12 FCC Rcd 8115, ¶ 7, n.14 (1997) (A wire center "might have one or several class 5 central offices, also called public exchanges or simply switches.").

These ported number data demonstrate that CLECs are using their switches to serve local customers ubiquitously throughout the BOCs' regions.[12] As of year-end 2001, one or more CLECs had ported a telephone number to its own switch in 47 percent of BOC wire centers, which contain approximately *86 percent* of all BOC switched access lines, including approximately 89 percent of all *business* lines and approximately 84 percent of all *residential* lines. *See* Tables 4 & 5. Significant numbers of BOC access lines are in wire centers served by multiple CLEC switches. *See id.*

The totals are even higher in the largest metropolitan areas. In the 100 largest MSAs, one or more CLECs had ported a telephone number to its own switch in 83 percent of BOC wire centers in those MSAs, which contain approximately *97 percent* of all BOC switched access lines in those MSAs. *See* Appendix C.

Table 4. Percentage of Wire Centers Where CLECs Have Acquired Customers Through Ported Numbers

	Percentage of Wire Centers Served by:			
	1 or more CLEC switch	2 or more	3 or more	4 or more
Verizon	44	32	26	22
SBC	47	35	28	25
BellSouth	58	39	32	28
Qwest	43	32	26	23
Total	**47**	**34**	**28**	**24**

Table 5. Percentage of Access Lines in Wire Centers Where CLECs Have Acquired Customers Through Ported Numbers

	Percentage of BOC Switched Access Lines in Wire Centers Served by:											
	1 or more CLEC switch			2 or more			3 or more			4 or more		
	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.	Bus.	Res.	Tot.
Verizon	90	83	85	84	75	79	80	69	73	75	64	68
SBC	88	83	85	82	75	77	74	66	69	70	62	65
BellSouth	94	90	91	85	79	80	79	71	74	73	65	67
Qwest	89	83	85	82	75	77	75	68	71	71	64	66
Total	**89**	**84**	**86**	**83**	**76**	**78**	**77**	**68**	**71**	**72**	**63**	**66**

[12] For purposes of this report we have included in the analysis switches owned by CLECs that have declared bankruptcy. Most such CLECs are still operational. Moreover, switches are a sunk investment, so if one company ceases to use its switch it is highly likely that another company will quickly seize the opportunity to do so (and will probably be able to obtain the switch at a fire-sale price). In addition, even though some CLECs may now be experiencing financial troubles, the fact that they were able to deploy so many switches at one time is still highly probative of the ability of CLECs to deploy switches generally. In any event, switches operated by CLECs that have declared bankruptcy (as of March 31, 2002) represent no more than 17 percent of the total counted for purposes of this report.

The areas that CLECs are capable of serving with their own switches also can be determined based on the NXX codes that CLECs have obtained. Each NXX code is associated with a "rate exchange area" served by an incumbent LEC.[13] The rate exchange areas where CLECs have obtained NXX codes are the areas where CLECs have determined they may use their own switches to compete directly with incumbent LECs.

Telcordia's *Local Exchange Routing Guide* (LERG) database contains the location of each CLEC switch, the NXX codes associated with those switches, and the rate exchange areas served by those NXX codes.[14] These data demonstrate that, as of year-end 2001, one or more CLECs had obtained an NXX code to serve approximately 47 percent of BOC rate exchange areas, and that significant numbers of rate exchange areas are served by multiple CLEC switches. *See* Table 6. In the 100 largest MSAs, one or more CLECs had obtained an NXX code to serve more than 85 percent of BOC rate exchange areas in those MSAs. *See* Appendix D.

Table 6. Rate Exchange Areas Where CLECs Have Obtained NXX Codes

	Percentage of Rate Exchange Areas Served by:			
	1 or more CLEC switch	**2 or more**	**3 or more**	**4 or more**
Verizon	43	26	20	16
SBC	46	25	14	8
BellSouth	64	41	29	19
Qwest	46	21	13	10
Total	**47**	**27**	**19**	**14**

The percentage of wire centers and rate exchange areas served by CLEC switches is a highly conservative measure of the extent to which CLECs actually serve – or have the ability to serve – customers using their own switches.

First, the data count only CLECs switches actually up and running, and only the locations that are presently served by these switches. CLECs could readily extend the geographic reach of existing switches, or deploy still more switches. As the Commission has found, whereas each ILEC switch typically serves only a single rate exchange area, CLECs can and do use their switches to serve multiple rate exchange areas.[15] As one CLEC explains, "[t]he advent of fiber

[13] Rate exchange areas are "geographically defined areas within which calls that originate and terminate (*i.e.*, remain within the area) are considered local calls." *FCC Local Competition Report, Dec. 1998 ed.* at 41, n.17.

[14] In the *Triennial Review Notice*, the FCC asked whether the LERG database "is a reliable indication of whether competitors can serve the mass market using their own switches." *Triennial Review Notice* ¶ 57. As an initial matter, while the LERG is itself a reliable source of the geographic areas to which CLECs have access with their switches, we also rely here on ported number data to make this showing. Thus, even if the Commission were concerned about the reliability of the LERG, it may rely on this alternative source of data. Moreover, as discussed below, once a CLEC has deployed a switch and is using that switch to serve business customers, it may readily expand the use of that switch to serve mass-market customers. Indeed, many competing carriers have done just that.

[15] *See UNE Remand Order* ¶ 261 ("switches deployed by competitive LECs may be able to serve a larger geographic area than switches deployed by the incumbent LEC, thereby reducing the direct, fixed cost of purchasing circuit switching capacity and allowing requesting carriers to create their own switching efficiencies."); *id.* ¶ 258

optic technologies and multi-function switching platforms have, in many cases, allowed carriers . . . to serve an entire statewide or LATA-wide customer base from a single switch platform."[16]

CLECs themselves report that they can and do use their switches to serve very large geographic areas – as large as an entire LATA, an entire state, or even multiple states. AT&T has stated that its "local switches serve geographic areas that are comparable to the areas served by SWBT's tandem switch."[17] For example, AT&T claims to serve both the entire Dallas LATA (LATA 552) and the entire Houston LATA (LATA 560) with one local switch apiece, whereas SBC serves these LATAs with 8 and 7 tandem switches, respectively, plus dozens of end-office switches.[18] Numerous other CLECs have made similar claims. *See* Table 7.

Table 7. Use of CLEC Switches to Serve Large Geographic Areas

WorldCom	"WorldCom uses state-of-the-art equipment and design principles based on technology available today . . . which makes it possible to access and serve a large geographic area from a single switch." "[W]hile WorldCom uses 4 local switches and a transport network to serve these [26] rate centers, BellSouth utilizes 5 local tandems and a multitude of end offices to serve this area."
ICG	"[T]he ICG switch provides services to customers in a geographic area at least as large as that serviced by the ILEC tandem."
AT&T	"It is important to note that in some cases, the AT&T switch serving a LATA is not physically located in the LATA."
Intermedia	"Instead of deploying a multiplicity of switches to cover an area, as is BellSouth's custom, Intermedia deploys a single switch to cover a very large area. Intermedia can do this because the switches it deploys are very capable and have a very large capacity." "From this map, it is clear that all the areas we serve in Jacksonville, Orlando, Tampa and Miami are each served by a single switch. This is a great deal of territory, all covered by four Intermedia switches."
US LEC	"For example, in the Jacksonville market, out network is designed to facilitate traffic termination to the same market as 2 BellSouth tandem switches. Our central office acts as tandem switch and as end office switch for the same 19 rate centers served by the two BellSouth switches."

Sources: See Appendix M.

Switch manufacturers have specifically designed their equipment to meet CLECs' needs to serve large geographic areas.[19] For example, Lucent's 5ESS – the most popular circuit switch

("facilities-based competitors need not deploy switches in exactly the same network configuration as an incumbent, thus allowing competitors to achieve their own unique and competitive efficiencies by deploying their own switches.").

[16] Prefiled Direct Testimony of Michael Starkey, ICG, NC Docket No. P-582, Sub. 6 at 21 (NC PUC filed May 27, 1999).

[17] Direct Testimony of Jon A. Zubkus on Behalf of AT&T Communications of Texas *et al.*, *Proceeding to Examine Reciprocal Compensation Pursuant to Section 252 of the Federal Telecommunications Act of 1996*, Docket No. 21982, at 3 (TX PUC filed Mar. 17, 2000).

[18] *Id.* ("[T]he TCG switch in Dallas serves the entire 552 LATA which SWBT also serves with 8 tandems. In Houston, the TCG switch serves the entire 560 LATA which SWBT also serves with 7 tandems.").

[19] *See, e.g.*, Lucent Technologies, *5ESS 2000 – Switch Mobile Switching Center*, http://www.lucent.com/products/solution/0,,CTID+2008-STID+10048-SOID+824-LOCL+1,00.html (5ESS provides "a unique and very attractive low-cost solution . . . to support growth opportunities in startup areas where existing

among CLECs – has "[r]emote switching capabilities" that make it possible to serve customers that are 2000 miles away from the host."[20] As of December 2001, CLECs had deployed approximately 360 remote switches in addition to the more than 1,300 host switches they have deployed.[21]

CLECs also may extend their competitive reach by deploying new switches or expanding the capacity of existing switches. In the last few years, switch manufacturers have made it easier and more cost-effective than ever for CLECs to purchase and deploy new circuit switches.[22] Switches have modular designs that enable a carrier to start small and add capacity as they grow.[23] The latest generation of switches also has very large maximum capacities – as much as 600,000 lines.[24]

Second, the data are based only on conventional CLEC circuit switches, even though all forms of circuit-switched traffic (including fax, e-mail, and data) are now being switched on packet rather than circuit switches. As described in Section II.B below, CLECs are rapidly

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traffic may not justify installing a standalone" switch.); Nortel Networks, *DMS-10 Carrier Class Switching System, Remote Switching Center-S*, http://www.nortelnetworks.com/products/01/dms-10/rscs.html. (Nortel remote switches "[e]xtend[] a full complement of host switch features to subscribers up to 650 miles from a DMS-100 or DMS-500 host, up to 100 miles from a DMS-10 host.").

[20] Lucent Technologies, *5ESS Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html ("*Lucent 5ESS Website*"); Lucent Technologies, *5ESS 2000-Switch Mobile Switching Centre (MSC)*, http://www.lucent.com/products/solution/0,,CTID+2008-STID+10048-SOID+824-LOCL+1,00.html.

[21] Telcordia, *January 2002 LERG*.

[22] *See, e.g.*, Lucent Technologies, *Maximize Your Opportunities With the Remoting Capabilities of the 5ESS-2000 Switch*, http://192.11.229.2/livelink/163997_Brochure.pdf (CLECs may "establish a presence in a new or small market at minimal cost," and "without making major capital investments."); P. Korzeniowski, *Pieces of Concern – The Communications Market Is One Big Puzzle, and CLECs Are Scrambling To Find the Right Fit*, tele.com (May 29, 2000) (quoting Pat Price, Lucent's director of switch product marketing: "We've cut the size of our switch in half and disabled some residential services, so a CLEC should be able to install a new central office switch in a month"); M. Reddig, *Top 10 Advances in Switching* (quoting Dan Lakey, senior market manager for CLECs, Taqua Systems: "Even the legacy switching products are consolidating common equipment into half as many cabinets and increasing port density on line and trunk modules."); Ericsson Marketing Brochure, *AXE Local 7.2*, http://www.ericsson.com/multiservicenetworks (AXE Local 7.2 switch reduces "costs for installation, operation and maintenance" with "new options for remote control [that] sav[e] time and money on service personnel.").

[23] *See, e.g., Lucent 5ESS Website* (5ESS "allows growth in increments simply by adding modules"); Nortel Networks, *DMS-10 Carrier Class Switching System*, http://www.nortelnetworks.com/products/01/dms-10/index.html (DMS-10 is specifically "[d]esigned for small to medium applications"); Siemens Press Release, *Siemens Debuts Denser Version of Its World-Leading Class 5 Switch to Meet Service Demands and Space Limitation* (June 4, 2001) (EWSD SX switch is "finding great popularity with carriers of all sizes who need exceptional functionality on a smaller footprint.").

[24] *See, e.g.*, Siemens A.G., *EWSD Powernode*, http://www.siemens.ie/fixedoperators/CarrierNetworks/switching/ewsd.htm ("The EWSD PowerNode can handle up to 600,000 subscribers and 240,000 trunks per switch and it supports ultra large Remote Switching Units, which can handle up to 50,000 subscribers or 8,500 trunks. The EWSD PowerNode is based on your current EWSD infrastructure, which qualifies it as a tool to consolidate your network."); Lucent Technologies, *Products and Services – 5ESS® Switch*, http://www.lucent.com/products/solution/0,,CTID+2002-STID+10055-SOID+935-LOCL+1,00.html ("A full-sized 5ESS® switch serves up to 250,000 subscriber lines and over 100,000 trunk lines."); Nortel Networks, *Products – DMS 500: DMS 500 System Advantage*, http://www.nortelnetworks.com/products /01/dms500/collateral/74038.16-09-97.pdf (the Nortel DMS-500 can support up to 122,278 lines and 45,288 trunks).

deploying packet switches to provide data services, and also are increasingly using these switches to provide voice services. The tabulated data also exclude wireless switches, even though wireless networks now switch at least one-quarter of the amount of voice traffic as wireline networks.[25]

Third, the tabulated data exclude PBXs. The FCC and independent analysts have all reached the conclusion that PBX systems compete directly with circuit-switched services.[26] As of year-end 1998, there were 45 million installed PBX lines in the United States.[27] As of year-end 2001, the number had grown to 56 million.[28] This means that on approximately 44 percent of all ILEC switched access lines serving business customers at least some of the switching was done by a switch other than an ILEC's own circuit switch.[29]

2. Use of CLEC Switches To Serve Mass-Market Customers.

As of year-end 2001, CLECs were serving approximately *three million* residential lines using their own switches. CLECs that are serving mass-market customers using their own switches have typically done so either by expanding the services on their existing large-customer-focused networks, or by expanding the geography of their existing broad-customer-based networks into adjacent territories. This service and geographic expansion typically involves the use or extension of existing facilities, not the conversion of unbundled local switching leased from an ILEC.

Service-Based Expansion To Serve Mass-Market Customers. CLECs have generally deployed switches to serve large business customers, in the first instance. Having done so, however, it is both straightforward and cost-effective for them to use these same switches to serve mass-market customers, and facilities-based CLECs are now doing so aggressively. *See* Table 8. Indeed, the wire centers in which CLECs already are serving business customers also contain the vast majority of all residential lines. As noted above, for example, the wire centers in

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[25] *See* note 141, *infra*.

[26] *See, e.g., Amendment of Part 69 of the Commission's Rules Relating to Private Networks and Private Line Users of the Local Exchange*, Notice of Proposed Rulemaking, 2 FCC Rcd 7441, ¶ 44 (1987) (decision to apply the surcharge to Centrex leakage as well as PBX leakage was "based upon a recognition that Centrex and PBX switches competed directly with one another."); *KLF Electronics v. Indiana Bell Telephone*, Memorandum Opinion and Order, 1 FCC Rcd 502, 503 n.3 (1986) ("Centrex service performs some of the same functions performed in a PBX, and therefore telephone exchange carriers offering Centrex compete with companies . . . that provide PBX switches."); H. Peterzell, *Centrex III – Some Other Considerations* (May 8, 1998), http://www.phonehelp.com/p-1-31.htm ("I know of nothing that can be accomplished with either of these technologies [PBX and Centrex] that cannot be accomplished with the other. Functionality, interestingly enough, is not a consideration.").

[27] Multimedia Telecommunications Association, *1998 Multimedia Telecommunications Market Review and Forecast* at 92 (1998).

[28] *Id.* (installed base of nearly 44 million PBX lines as of year-end 1997); Multimedia Telecommunications Association, *2001 Multimedia Telecommunications Market Review and Forecast* at 105, 108 (2001) (12 million new add-on PBX lines shipped between 1998 and 2001) (2001 add-on lines estimated using average percentage of shipments attributed to add-on lines, 1998-2000).

[29] This figure was derived as follows: PBX lines in use today (55,868,000) divided by combined Business Switched Access Lines and Special Access Lines (128,015,263). *FCC Statistics of Common Carriers, 2000/2001 ed.* at Table 2.4.

which CLECs have ported numbers to their own switches contain 84 percent of all BOC residential access lines, in addition to 89 percent of all BOC business lines.

Cable operators have used a comparable at-the-margin strategy for getting into mass-market voice service. Here, video and data services have provided the economic entry point that has justified the initial build out of the network. The cable telephony that has been commercially deployed to date relies on the same type of circuit-switches that ILECs and CLECs use. *See* Table 9. At least five cable operators – including AT&T, Cox, Comcast, Cablevision and Insight – have actually deployed commercial circuit switched cable telephony.[30] Circuit-switched cable telephony has been deployed in 20 states and is now available to more than 10 million U.S. homes – approximately 10 percent of the mass market.[31] More than 1.5 million homes subscribe.[32] Cable operators are adding over 70,000 customers a month for their residential telephony services.[33] By the end of 2002, circuit-switched cable telephony is expected to be available to more than 11 percent of all homes, with an estimated 2.4 million of these homes actually subscribing.[34]

In some states, cable telephony is already far more widely available than nationwide averages suggest. For example, the Commission has recognized that Cox already has the "capability to provide cable telephony service to 75 to 95 percent of Rhode Island customers."[35] AT&T offers cable telephony services to large fractions of the nearly three million homes its cable network passes in the Boston Area,[36] the approximately 600,000 homes it passes in the Pittsburgh area,[37] the 3.5 million homes it passes in the Chicago area,[38] and the 2.7 million

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[30] *See* M. Stump and K. Brown, *Comcast Plunges Into Telephony*, Multichannel News at 5 (Dec. 24, 2001); *Cabling Home*, Nashville Bus. J. at 17 (Feb. 1, 2002); *Eighth Video Competition Report*; T. Kerver, *Operator of the Year*, Cablevision (Oct. 22, 2001). There currently are two major cable operators – AT&T and Cox – and a third smaller one, Insight, that are actively deploying circuit-switched cable telephony to new areas. *See* Yahoo! Business, *AT&T and Comcast Remain On Watch Neg* (Dec. 20, 2001), http://biz.yahoo.com/bw/011220/202353_1.html; K. Darce, *Local Phone Arena Gets New Players*, Times-Picayune at 1 (Feb. 8, 2002); Insight Communications, *Services*, http://www.insight-com.com/services/.

[31] *See JP Morgan Cable Industry Report* at Table 22; *NCTA Cable Telephony Report* at 2.

[32] *See* NCTA, *US Cable Telephony Subscribers (in Thousands 1998-2001)*, http://www.ncta.com/industry_overview/indStats.cfm?statID=13.

[33] *See NCTA Cable Telephony Report* at 1.

[34] *See JP Morgan Cable Industry Report* at Table 22.

[35] *See, e.g., Rhode Island Order* ¶ 105.

[36] *See* Dan Somers, President and CEO, AT&T Broadband, *Operational Overview*, AT&T Broadband, Investor Presentation, July 2001, at 16 (stating that AT&T's network in Boston has "2.9 million homes passed," that "plant upgrades [are] nearly complete, [to be] able to offer complete bundle," and that there is already "11% telephony penetration" and ">100k customers.").

[37] As of mid-2000, AT&T offered cable telephony to at least 165,000 of its approximately 400,000 subscribers in the Pittsburgh Area. *See Company Offers Free Phone Service in Bid for Customers*, Associated Press State & Local Wire (Aug. 31, 2000); NCTA, *Top 25 Cable Systems*, http://www.ncta.com/industry_overview/aboutIND.cfm?indOverviewID=56. AT&T's network passes roughly 600,000 homes, assuming a nationwide cable penetration rate of approximately 66 percent.

[38] *See* Dan Somers, President and CEO, AT&T Broadband, *Operational Overview*, AT&T Broadband, Investor Presentation, July 2001, at 17 (stating that AT&T's network in Chicago has "3.5 million homes passed," a

homes it passes in the Bay Area.[39] And, as discussed below, most major cable operators have stated that they soon plan to deploy cable telephony even more broadly by relying on packet-switched, IP-based technology.

Table 8. CLECs Providing Facilities-Based Residential Service

CLEC	State	
ALLTEL	AR, FL, NC, NE, OH, PA	"ALLTEL began offering local telephone service to area [Raleigh] residents this week, two months after launching local telephone service to [Raleigh] area businesses."
AT&T	CA, CT, FL, GA, IN, KY, MD, MA, MN, NH, PA, UT, VA, WA	"AT&T Broadband now markets cable telephony to approximately seven million households in 16 markets, has over one million customers (or 14.8% of its marketable homes with penetration rates reaching 30% in some communities), and continues to expand the availability of competitive local telephony services to homes throughout the former TCI and MediaOne footprints."
BayRing	NH	"BayRing owns and operates two CLASS 5 Digital Switches that are housed at the Pease International Tradeport in Portsmouth, NH"; "offers residential and business customers competitively priced local, long distance, Internet and dedicated access services."
Broadview Networks	MA, NJ, NY, PA	"Broadview Networks...is a network-based electronically integrated communications provider (e-ICP) serving small and medium-sized businesses and communications-intensive residential customers in the northeastern and mid-Atlantic United States."
Cablevision	CT, NJ, NY	"[Cablevision] provides residential telephone and cable modem internet access service in portions of the greater New York City metropolitan area and parts of southern Connecticut." "At December 31, 2000, the Company served approximately 239,000 modem subscribers and approximately 12,000 residential telephone subscribers."
Cavalier Telephone	DE, MD, PA, VA	"Cavalier targets business and residential customers, the latter composing 60 percent of its customer base. It generally markets residential services to employees of the various businesses it serves."
CenturyTel	LA	"The Company is currently offering CLEC services to residential and small and medium sized business customers in Shreveport and Monroe, LA. CenturyTel will employ an 'edge-out' strategy for its CLEC expansion."
Comcast	MI	"It now seems that Comcast has 15,000 circuit-switched telephony customers across a base of 150,000 homes passed in 12 Michigan towns, including Ann Arbor, Birmingham and Dearborn."
CoreComm	IL, MI, OH, PA, WI	"CoreComm is a national, partially facilities-based CLEC serving both the residential and the business markets, primarily in the Midwest and the Northeast."
Cox	AZ, CA, CT, LA, NE, OK, RI	"[B]y March 31, 2001 Cox Communications was serving 300,000 residential customers using 410,000 residential access lines, making Cox the equivalent of the 12th largest telephone company in the country."
CTC Exchange	NC	"The CLEC is deploying two strategies...The second as a Greenfield that the Company calls SLEC...building infrastructure in new residential and business developments."

"strong telephony roll-out" with "backbone and headend segments of rebuilds nearly complete," "18% telephony penetration" and "some suburbs have 40% penetration.").

[39] *See id.* at 18 (stating that AT&T's network in the Bay Area has "2.7 million homes passed," "backbone and headend segments of rebuilds nearly complete," "19% telephony penetration" and "many communities in high 20s").

Table 8. CLECs Providing Facilities-Based Residential Service		
CLEC	**State**	
CTSI	NY, PA	"CTSI will continue to focus on its three original 'edge-out' markets (Wilkes-Barre/Scranton/Hazleton, Harrisburg and Lancaster/Reading/York, PA). CTSI has its own host switches in Harrisburg and in Wilkes-Barre, PA. CTSI serves the Lancaster/Reading/York market with remote switches connected by fiber to CTSI's Harrisburg host switch."
Grande Communications Network, Inc.	TX	"Grande Communications is building a ground-up deep fiber broadband network to homes and businesses. Grande will deliver high-speed Internet access, local and long distance telephone and cable television entertainment services over its own advanced broadband network to communities in Texas."
Insight	KY	"Insight Communications Co. is moving forward on a cooperative voice deal it signed last year with AT&T Broadband. Insight has rolled out primary-line cable telephony in Louisville, Ky., a system that serves 25,000 marketable homes."
Knology	AL, FL, GA, SC, TN	"Knology Broadband offers residential and business broadband services, including analog and digital cable television, local, and long distance telephone, high-speed Internet access service, and other services including broadband carrier services (BCS) using two-way high capacity hybrid fiber/coaxial Interactive Broadband Networks."
LecStar	AL, FL, GA, KY, MS, NC, SC, TN	"LecStar Corporation is a facilities-based integrated communications carrier (ICC)." "LecStar offers a full array of fixed wire-line voice, data, Internet and operator services to business and residential customers throughout BellSouth's Southeastern operating territory."
NTELOS	KY, VA, WV	"NTELOS Inc...is a regional telecommunications provider offering a wide range of services to business and residential customers in Kentucky, Virginia and West Virginia." "NTELOS is pursuing an edge-out build strategy. NTELOS enters markets that are physically proximate to its existing ILEC operations and uses its brand and existing infrastructure to expand into them."
NTS Communications, Inc.	NM, TX	"The Company currently offers facilities-based local telephone service in the cities of Amarillo, Lubbock, Abilene, Wichita Falls, Midland/Odesa, San Angelo, and San Angelo TX, and also in Albuquerque, NM." "With NTS's facilities-based local dial tone product, you use NTS's network facilities – not those of the traditional telephone company."
RCN	CA, DC, MA, NY, PA	"Our multi-service network is presently operating in Boston, Manhattan, Lehigh Valley, Washington, D.C., San Francisco, Queens, Chicago, and Philadelphia. . . . The Company's telephone switching network utilizes either the Lucent 5ESS-2000 or the Nortel DMS-100 switching platforms as the local switching element, and the network is designed to provide highly reliable lifeline telephony service. In each of the markets which are operational, a telephone switch is installed and fully operational."
Rio	OR	"Rio Communications has invested $1 million to set up its own switch in Eugene, said Ed Marcotte, president and part-owner of Rio. The 5-year-old, Eugene-based firm operates roughly 1,000 phone lines, serving about 30 customers. It is adding about 500 business lines a month and hopes to launch residential service by the fall, Marcotte said."
Sources: See Appendix M.		

Table 9. Commercial Circuit-Switched Cable Telephony Deployment			
	Homes Passed for Cable Telephony	**Cable Telephony Subscribers**	**Future Plans**
AT&T	approximately 7 million	1 million (EOY2001)	AT&T expects to expand service to approximately 5-6 million homes per year
Cox	Orange County; San Diego; Omaha; Oklahoma City; Phoenix; Tucson; RI; CT; Tidewater area, VA	400,000 (EOY2001)	"Since December [2001], Cox has launched residential phone service over its cable television network in St. Charles and St. Bernard parishes. Phone service will be extended to Jefferson Parish by mid-summer [2002] and to Orleans by the end of the year, Cox spokesman Steve Sawyer said."
Comcast	150,000	40,000 (EOY2001)	Using AT&T switches, plans soon to deploy circuit-switched telephony to 1 million Comcast homes
Cablevision	Long Island, NY	12,500 (June 2001)	Plans to deploy IP Telephony more broadly
Insight	Louisville, KY	2,000 (Oct. 2001)	The first telephony customers have been connected in parts of the Louisville, KY and Evansville, IN systems, with launches to follow in Lexington, KY and Columbus, OH later this year.
Sources: See Appendix M.			

Geographic Expansion to Mass-Market Customers. As discussed in more detail in Section IV.B.3, a number of incumbent local exchange carriers have been pursuing edge-out strategies, pushing into the territories of adjacent ILECs.[40] For example, CTSI – the CLEC subsidiary of Commonwealth Telephone (the second largest ILEC in Pennsylvania) – operates a competitive voice network in Verizon's service territory in Wilkes-Barre, Harrisburg, and Lancaster that serves business and residential customers.[41] ALLTEL has deployed competitive facilities – including switches – adjacent to its ILEC service territories in Little Rock, Charlotte, Cleveland, Jacksonville, and Tallahassee.[42]

Some existing cable telephony providers also are engaging in geographic expansion, and many other cable operators could no doubt do so. For example, AT&T's merger partner,

[40] *See, e.g., NPRG CIOC Report 2001*, Ch. 2 at 1 ("[Competitive Independent Operating Companies ('CIOCs')] target RBOC markets that are geographically proximate to their existing ILEC holdings. This 'edge-out' strategy allows the CIOC to take advantage of the synergy of its ILEC and CLEC operations while entering typically underserved non-urban markets. CIOCs are able to employ infrastructure, brand, and local experience to gain market penetration and achieve profitability."); *id.* Ch. 2 at 2 ("All CIOCs target business customers and depending on individual market characteristics, also target residential customers through the use shared lines or through infrastructure overbuilds.").

[41] *See* Commonwealth Telephone Enterprises, Inc., Form 10-K (SEC filed Mar. 27, 2001); *NPRG CLEC Report 2001, 14th ed.*, Ch. 13 – CTSI, Inc. at 7; CTE Press Release, *CTE Announces Restructuring of CTSI Subsidiary* (Dec. 6, 2000).

[42] *See* ALLTEL, *Coverage Maps: National Map*, http://www.alltel.com/news_information/maps/download/bigjpgs/US.jpg; *NPRG CIOC Report 2001*, Ch. 7 at 8-9. In March 2002, ALLTEL announced that it will discontinue its CLEC operations in seven of ten states (representing less than 20 percent of ALLTEL's CLEC access lines); however, the company has not identified which states will be affected by this change. *See* ALLTEL Corp., Form 10-K405 (SEC filed Mar. 5, 2002).

Comcast, states that it can easily and cheaply use AT&T's existing switches to provide residential telephony service to Comcast's existing cable subscribers.[43] Comcast's Treasurer, John Alchin, states that "'when you look at what AT&T has already done in terms of infrastructure and the huge investment they've made . . . we can more easily piggyback off that in an economically efficient way.' Between 70% and 80% of Comcast's existing systems are within 'striking distance' of existing AT&T Broadband switching services . . . 'making the incremental roll-out of telephony in Comcast legacy systems compelling.'"[44] Comcast plans to roll out circuit-switched phone service to as many as one million Comcast households upon closing its proposed merger with AT&T.[45]

Collocation and Hot-Cut Issues. As discussed in Section IV.A, CLECs that serve large business customers with their own switches typically do so directly through fiber connections they have deployed. Mass-market customers do not always generate enough traffic to justify a fiber link, so many CLECs that seek to serve such customers with their own switch will do so through an unbundled loop obtained from an ILEC. In order to do so, the CLEC will first obtain collocation in the ILEC's central office. Where the customer that the CLEC seeks to serve already is receiving dial-tone service from the ILEC, the CLEC will typically request that a hot cut be performed on the loop serving that customer. A hot cut involves moving the end-user customer's loop from the ILEC's switch to the CLEC's switch.

At the time of the *UNE Remand Order* the Commission declined to curtail availability of the switching UNE primarily because of the time and cost associated with obtaining collocation space and local loops through the hot-cut process.[46] Concerns about collocation and hot-cut performance have been fully addressed since the time of the last UNE review, however.

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[43] *See, e.g., Cable Companies Tell Analysts They're Confident About Prospects*, Warren's Cable Regulation Monitor (Jan. 14, 2002) ("With switches already in place in 8 of 10 biggest U.S. markets, only $5-$50 million is needed to be invested to complete phone service for residences."); M. Farrell, *AT&T Wants to Tweak Digital Packages Again*, Multichannel News (Jan. 14, 2002) ("[Comcast President Brian] Roberts had been lukewarm on cable telephony in the past – before the merger agreement, Comcast had said repeatedly that it would wait for lower-cost Internet-protocol telephony to become a reality – but he's now one of its biggest proponents. . . . Roberts said telephony can be rolled out in Philadelphia and Detroit for between $5 and $50 per customer, because AT&T has already invested in the switching infrastructure in those markets. That $5 to $50 cost would mainly power the phone service at each customer home."); J. Borland, *Comcast, AT&T Cable Deal To Create Net Giant*, CNET News.com (Dec. 20, 2001) ("Steve Burke, president of Comcast Cable, said in Thursday's conference call that introducing phone services to Comcast customers could generate $600 million to $800 million annually within the next five years. 'If we overlay their expertise, their investment, their people and learning, and roll out telephony to our footprint, it could represent a very significant opportunity,' he said.").

[44] M. Scanlon, *AT&T Broadband Deal Lets Comcast Accelerate Telephony*, Cable World (Jan. 7, 2002).

[45] *See* Applications and Public Interest Statement of AT&T Corp. and Comcast Corporation at 38, *Application for Consent to the Transfer of Control of Licenses, Comcast Corporation and AT&T Corp., Transferors, to AT&T Comcast Corporation, Transferee*, MB Docket No. 02-70 (FCC filed Feb. 28, 2002) ("Comcast President (and AT&T Comcast CEO) Brian L. Roberts has announced that the merged company intends to begin to deploy telephone service in the Philadelphia and Detroit markets currently served by Comcast, after closing, bringing facilities-based local telephone choice to about one million additional homes.").

[46] *See UNE Remand Order* ¶¶ 269-271.

The Commission has expanded the range of collocation options and imposed standard time limits.[47] And collocation in BOC regions has risen very sharply. At the end of 1998, for example, CLECs had obtained roughly 4,000 collocation arrangements in BOC regions; by year-end 2001 there were approximately 25,000 CLEC collocation arrangements in place. CLECs are now collocated in central offices that serve approximately 81 percent of BOC access lines – including approximately 79 percent of BOC residential lines. *See* Table 10.

Table 10. Collocation by Region

	Verizon	SBC	BellSouth	Qwest	Total
Collocation Arrangements YE 1998	1,100 (excl. GTE)	2,000	870	240	**4,300**
Collocation Arrangements YE 2001	7,000	9,900	4,700	3,300	**24,900**
% of Residential Lines in WCs served by collocation	74	83	77	84	**79**
% of Business Lines in WCs served by collocation	84	87	87	90	**86**
% of Total Lines in WCs served by collocation	78	85	80	86	**81**

Totals may not equal sum of parts due to rounding.

The availability in the market of alternatives to traditional collocation also has been greatly expanded in recent years due to the rapid rise of alternative collocation providers (so-called collocation "hotels"), which give competitive local carriers places to deploy their switches and interconnect their networks. These companies provide "high-security facilities operated by independent companies that put telecom gear as close as possible to incumbent central offices without actually being there."[48] They permit CLECs to "easily connect with, and hand off traffic to, the IXCs and each other."[49] They allow "[m]ost new business telecom providers . . . to bypass the traditional infrastructure."[50] Today, there are alternative collocation providers in virtually all major metropolitan areas throughout the country. *See* Appendix G.

With respect to hot cuts, any concerns about hot-cut performance have been reduced as both sides have gained further experience and worked out the rough spots in their respective processes. Indeed, since the *UNE Remand Order*, the FCC has repeatedly found that BOC

[47] *See, e.g., Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Order on Reconsideration and Second Further Notice of Proposed Rulemaking, 15 FCC Rcd 17806 (2000); *Deployment of Wireline Services Offering Advanced Telecommunications Capability*, Fourth Report and Order, 16 FCC Rcd 15435 (2001).

[48] D. Culver, *Construction Boom for Colocation.*

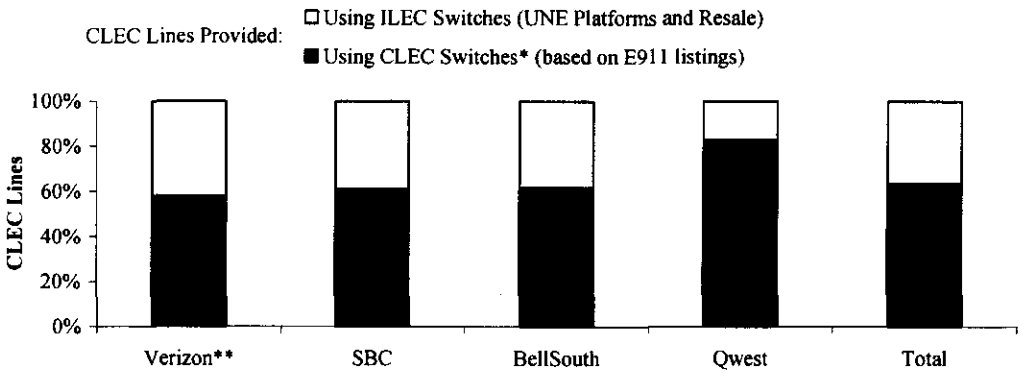
[49] A. Lindstrom, *Checking Out Carrier Hotels,* America's Network (Nov. 1, 1997).

[50] V. McCarthy, *Local Carriers Take Over Office Buildings,* Interactive Week (May 22, 2000), http://www.zdnet.com/intweek/stories/news/0,4164,2574580,00.html (quoting Sean Dohety, president, Urban Media).

performance in providing hot-cuts to CLECs is satisfactory.[51] And, as demonstrated in Appendix H, the Bell companies' hot-cuts performance is now excellent.

Migration of Mass-Market UNE-P Customers to CLEC Switches. Collectively, CLECs use their own switches to serve most of their customers. *See* Figure 3. Some CLECs, however, continue to rely primarily on the UNE Platform, which of course includes the switching element, to serve mass-market customers.[52] These CLECs maintain that they remain dependent on ILEC switches to serve mass-market customers because they "cannot rationally invest in switches . . . until they have used UNE-P to build up a customer base."[53] But that assertion cannot be squared with the economics of switch deployment, and with the actual marketplace track record that other CLECs have established.

Figure 3. Breakdown of CLEC Lines by Mode of Entry



*The number of lines provided entirely over CLEC facilities and using CLEC switches is based on the number of E911 listings CLECs have obtained. Because the actual number of lines that CLECs are serving with their own switches is likely much higher, this method will, if anything, understate the percentage of all lines that CLECs are serving in whole or in part over facilities they have deployed themselves.
**Verizon data do not include the former GTE territory.

It certainly is clear that some CLECs are not migrating mass-market UNE-Platform customers to their own facilities, and have no plans ever to do so. In New York, for example, AT&T and WorldCom together provide UNE-P service to well over one million residential customers[54] – enough customers, in other words, to fill five to ten switches. Together, AT&T

[51] *See, e.g., New York Order* ¶ 291; *Massachusetts Order* ¶ 159; *Connecticut Order* ¶ 13; *Pennsylvania Order* ¶ 86; *Texas Order* ¶ 256; *Kansas/Oklahoma Order* ¶ 199; *Arkansas/Missouri Order* ¶ 102.

[52] In the Bell companies' regions, approximately two-thirds of all platforms are used to serve residential customers, and the percentage is even higher in Verizon's and SBC's regions (80 percent and 70 percent, respectively). Most of the platforms used in the business sector appear to be used to serve small business customers, which the FCC previously has held are part of the same "mass market." *See, e.g., Bell Atlantic/NYNEX Merger Order* ¶ 70. For example, nearly 25 percent of all platforms used to serve business customers are sold in BellSouth's region, and half of those are sold to business customers with only 1-3 lines.

[53] Ex Parte Letter from Robert W. Quinn, AT&T, to William F. Caton, FCC, CC Docket No. 01-347 (Mar. 1, 2002).

[54] S. Alexander, *Judge Recommends Qwest Be Fined for Impeding Local Service by AT&T; But AT&T Says It Won't Enter Market*, Star Trib. (Feb. 26, 2002) (AT&T vice president Tom Pelto said that AT&T uses the UNE-Platform to provide local residential phone service to about 1 million people in New York.); M. McDonald, *Local*

and WorldCom also operate 28 local circuit switches in New York state.[55] Yet these two carriers do not appear to have converted any residential customers in New York to their own switches.[56] The experience has been no different in other states where AT&T and WorldCom have signed up large numbers of UNE-P customers. Other CLECs that have obtained UNE Platforms to serve mass-market customers also have conceded that they have no plans to convert these customers to their own switches, even after they have acquired a large customer base. They view UNE-P competition as an end in itself, rather than as a stepping stone to facilities-based competition.

Their position is based on business judgment, however, not on any economic imperatives. The UNE-P-forever CLECs have simply decided that there is more to be gained from relying on UNEs at TELRIC prices than from deploying their own facilities.

To begin with, many other CLECs *are* deploying switches to serve mass-market customers. Indeed, most of the CLECs that have deployed one or more switches, and that also serve mass-market customers, make little if any use of unbundled BOC switching. Leaving aside service provided over cable networks, at least nine CLECs in Bell company regions provide facilities-based service to 25,000 or more residential lines (based on their E911 listings). *See* Figure 4. Seven of the nine buy *no* UNE-P service at all. The remaining two represent only 3 percent of all facilities-based residential lines. But for one of these two CLECs, UNE Platforms represent only five percent of the residential lines that this carrier serves.

The same circuit switch in the same wire center can and routinely does serve both business and residential customers – ILECs use *their* switches in precisely that way, and many CLECs do too. For example, many of the cable operators that are now providing circuit-switched cable telephony are doing so using switches deployed originally by their CLEC affiliates to serve business customers.[57] With switching, perhaps more so than with any other

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Phone Fight Gets Put on Hold, Crain's N.Y. Bus. at 1 (Mar. 5, 2001) (WorldCom accumulated 400,000 customers in New York).

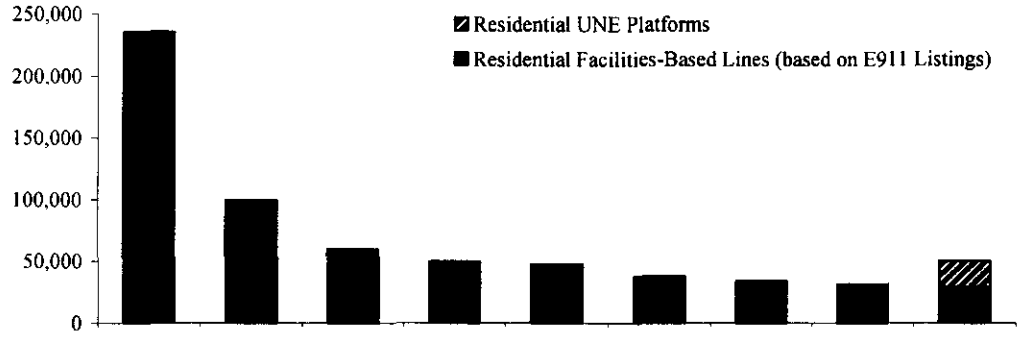
[55] *See* Appendix B.

[56] *See* Declaration of Vijetha Huffman ¶ 5, *attached to* Comments of WorldCom, Inc., *Application of Verizon New Jersey, Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions), Verizon Global Networks Inc. and Verizon Select Services Inc. for Authorization To Provide In-Region, InterLATA Services in New Jersey*, CC Docket No. 01-347 (FCC filed Jan. 14, 2002) ("UNE-P . . . is the only service-entry vehicle that WorldCom uses to offer local residential service, and it is the only service-delivery option that WorldCom currently views as even potentially viable."); Supplemental Declaration of Michael Lieberman on Behalf of AT&T Corp. ¶ 20, *attached to* Ex Parte Letter of Peter Keisler, Sidley Austin Brown & Wood (representing AT&T), to William F. Caton, FCC, CC Docket No. 01-324 (Feb. 8, 2002) (AT&T has recently stated that it has not pursued a strategy of converting platform customers to its own facilities "to provide basic local residential service to customers anywhere in the country.").

[57] *See, e.g.*, K. Zia, Deutsche Banc Alex. Brown, Investext Rpt. No. 8089704, Cablevision Systems Corp. – Company Report at *5 (Apr. 16, 2001) ("On the cable telephony front, Cablevision has introduced a switched-circuit residential solution in its Long Island, NY and Connecticut markets, which leverages the infrastructure and switches of its CLEC subsidiary, Lightpath."); K. Zia, Deutsche Banc Alex. Brown, Investext Rpt. No. 8089709, Adelphia Communications – Company Report at *6 (Apr. 16, 2001) ("Adelphia plans to roll out residential telephony using packet-switched (IP) technology in 2002, with the substantial advantage over most others in the industry of being able to tap its relationship with its CLEC subsidiary Adelphia Business Solutions. Leveraging ABS's already laid fiber, switches, co-location agreements with ILECs and back-office infrastructure, should provide Adelphia with significant time-to-market and cost structure advantages.").

network element, residential service can readily be added at the margin. And the vast majority of residential customers are now in reach of CLEC switches already in operation. CLEC switches are up and running in wire centers that serve 86 percent of all BOC access lines. And these same wire centers serve about 84 percent of BOC residential lines.

Figure 4. Use of UNE Platforms by CLECs Providing Service to 25,000 or More Residential Lines Using Their Own Switches*



*Excludes CLECs providing service over cable facilities. Does not include CLECs in Qwest's region.

CLECs providing service to 25,000 or more facilities-based residential lines include: ALLTEL, Broadview, Cavalier Telephone, Intermedia, Knology, McLeodUSA, RCN, TDS, and TOTALink.

The only other justification that CLECs have given for their failure to convert mass-market customers from Platforms to their own switches relates to the cost of migrating the customer, not the cost of deploying or operating the switch itself. This does not establish that the UNE Platform is necessary for competition; to the contrary, it establishes that facilities-based competition will develop faster if CLECs do not build their customer base on UNE-P service at all.

As described above, the costs associated with collocation have fallen sharply since the *UNE Remand Order*, as the Commission has created numerous alternatives to traditional physical arrangements. The rates for hot cuts are set using TELRIC principles, and the BOCs' hot-cut performance is closely monitored by state commissions. As a result, the transactional costs that CLECs seeking to use their own switch must incur are no different than the costs that any other network provider – including ILECs and cable companies – would need to incur to connect loops to its own switches.

But even assuming that hot-cut costs remain significant, substantial numbers of customers that seek phone service are entirely "new" customers in that they are first-time subscribers at the location at which they are requesting service. Wireline telephone companies add approximately six million subscriber lines each year.[58] And, because people move, a significant fraction of existing customers terminate their current phone service and initiate new service at some other location every year.[59] Together, these two groups define a large base of

[58] *See FCC Trends in Telephone Service, Aug. 2001 ed.* at Table 8.1.

[59] *See, e.g.*, U.S. Census Bureau, *Statistical Abstract of the United States: 2001* at 28 (Nov. 2001) (from 1999-2000, 15 percent of the U.S. population, or approximately 40 million people, changed residences).

customers who can be served without incurring the transaction costs associated with moving an established customer off of an ILEC switch and on to a CLEC alternative.

B. Packet Switches as Substitutes for Circuit Switches.

CLEC packet switches are already a very significant competitive alternative to ILEC circuit switches.

Packet switches substitute for circuit switches to the extent that traffic can be routed directly to a packet switch, without first being routed through a circuit switch. All forms of telecommunications traffic can now be transmitted and switched, end-to-end, in digital rather than analog format. And because packet switches are far more efficient in handling digital traffic than circuit switches, the economics of migrating traffic from circuit to packet switches have become incredibly compelling. Indeed, there already is far more data traffic than voice traffic, even on the circuit-switched public telephone network.

Of course, the CLEC packet switches in many cases also either are or are capable of being used to provide voice services. Long-distance carriers have been migrating their traffic to high-speed packet switches for several years. Having gained a robust, profitable entry point in high-speed data, *local* providers are now offering messaging and voice services over those networks too. The number of customers with local data links to packet switches is already large and growing very rapidly. And a large and growing share of these data links connect to packet switches that competing carriers – including CLECs, wireless carriers, and cable providers – own and operate.

Direct Customer Links to Packet Switches. At the time of the last UNE review, 98 percent of online households still relied on dial-up connections – and thus on ILEC circuit switches – for their data services.[60] As discussed further in Section IV.C, however, nearly eight million residential users – or roughly 9 percent of online households – now have broadband cable or wireless data links instead, which bypass ILEC networks completely, and terminate directly on a competitive packet switch.[61] If all eight million of these broadband users would otherwise be using dial-up connections, the packet switches used to provide these broadband services now displace at least 4 percent of all circuit-switched minutes of use, even assuming that the average data line is used only as much as the average voice line.[62] The total would be far higher if one takes into account the fact that data calls generally last much longer than voice calls, and that data lines are therefore used much more, on average, than voice lines.[63]

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[60] *JP Morgan Cable Industry Report* at Table 13. *See also* D. Lathen, Cable Services Bureau, FCC, *Broadband Today: A Staff Report to William E. Kennard, Chairman, Federal Communications Commission, On Industry Monitoring Sessions Convened by Cable Services Bureau* at App. A (Oct. 1999).

[61] *See Gartner U.S. Consumer Telecommunications and Online Market Report* at Table 7-1; *Morgan Stanley Cable Modem/xDSL Report* at Exh. 3 (cable modem).

[62] This was derived as follows: (8 million cable/wireless broadband lines)/(174 million ILEC access lines + 8 million cable/wireless broadband lines). *See FCC Local Competition Report, Feb. 2002 ed.* at Table 1 (as of June 2001, the ILECs served 174 million access lines, which has been declining in each of the last three years).

[63] *See, e.g.,* T. Taesler, *Home Internet Solution – Always-On Internet Access*, Ericsson Review, Special Issue (1998), http://www.ericsson.com/about/publications/review/1998_01b/article42.shtml ("In general, Internet call